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(54) Feeding conditioned air into vehicles

(57) An arrangement for feeding conditioned air into passenger compartments of vehicles has, on the one hand, air-outflow surface for a diffuse air distribution 19 and on the other hand, selectively closeable air-outflow ports 26 with a direct air flow. In order to achieve a draught-free ventilation with a high air throughput, independent of the closing of the air-outflow ports 26 with direct air flow, at least some of the air-outflow ports 26 are designed in such a way that, with their closing, they switch to a diffuse aid distribution. In one embodiment rotatable flap 28 includes throughbores 31. Alternatively, in an array of louvres, each louvre includes throughbores. A slidable blind may be used where space is limited.

Fig. 2

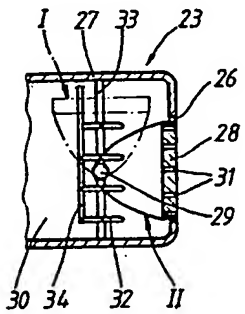

Fig. 1

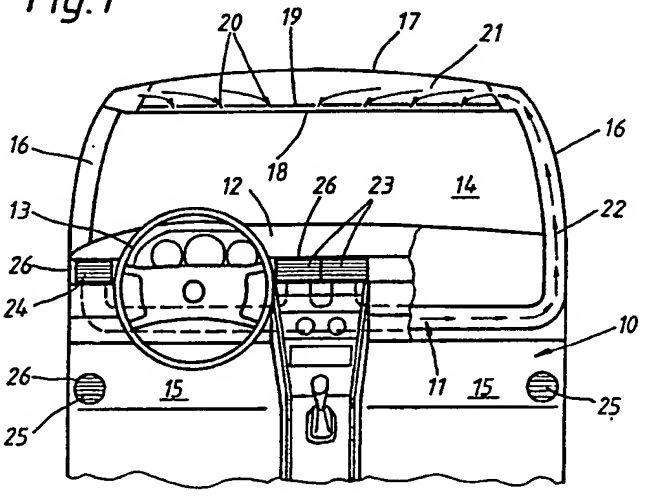

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Fig. 1

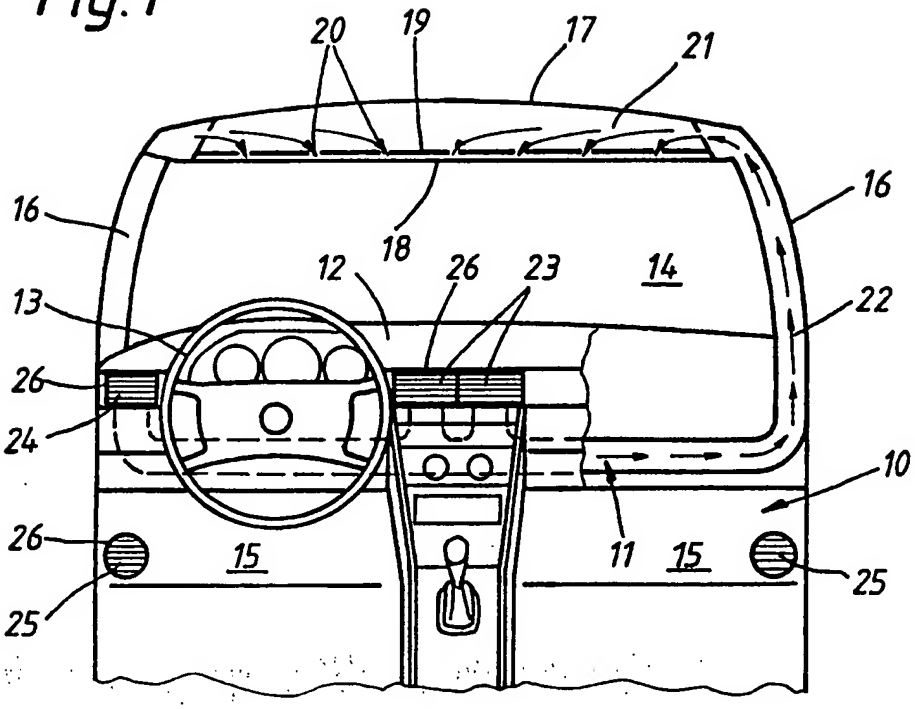

Fig. 2

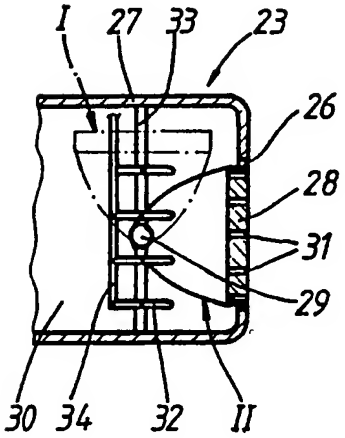

Fig. 3

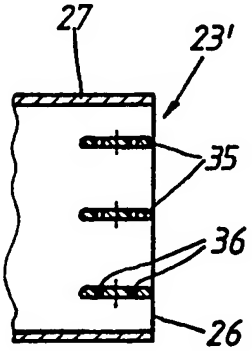

Fig. 4

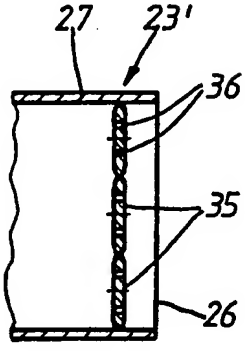

Fig. 5

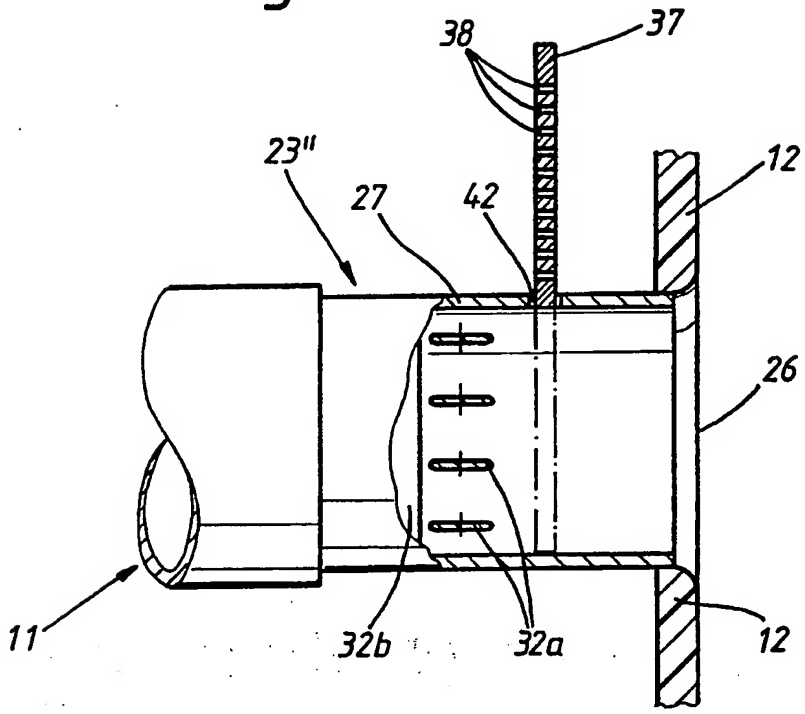
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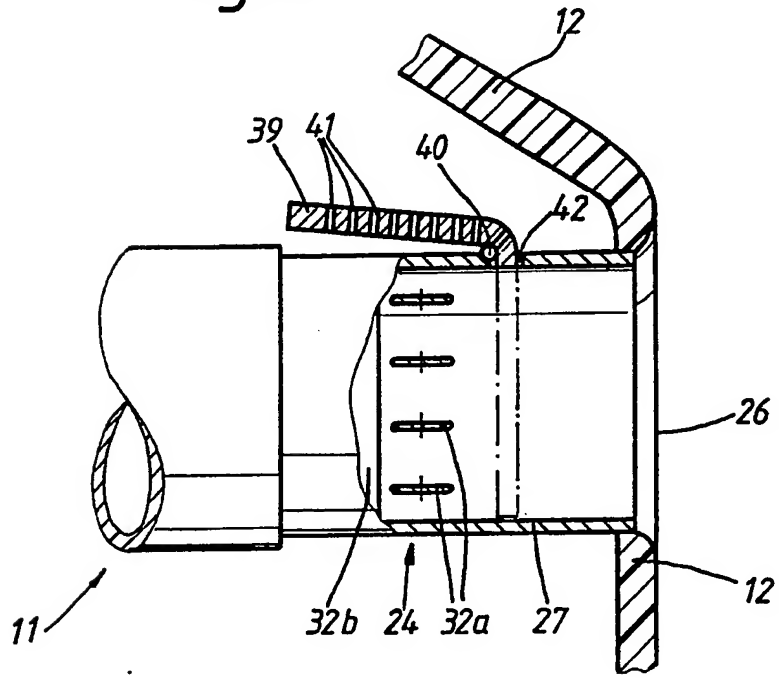
Fig. 6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Arrangement for feeding conditioned air into passenger compartments of vehicles

The invention relates to an arrangement for feeding conditioned air into passenger compartments of vehicles with a wide-area diffuse air distribution and selectively closeable air-outflow ports having a direct air flow.

In such air-feed arrangements usually used in conjunction with air-conditioning systems, it is desirable to obtain a high air throughput at a low air-flow speed in order to achieve a comfortable draught-free interior climate in the passenger compartment. A wide-area diffuse air distribution in particular serves this purpose. For special purposes, for example for the demisting of windscreens or concentrated heating in the foot space, there are air-outflow ports with a direct air flow which are designed so as to be selectively closeable.

In a known arrangement of the type mentioned in the introduction (German Utility Model 1,909,519), the entire dashboard is designed as a limiting wall of a transversely running air-feed duct and is provided with a plurality of air-passage bores for diffuse air distribution. Two air nozzles arranged on top of the dashboard near the windscreen serve for subjecting the windscreen to a direct air flow. Conventionally, there are further air nozzles, such as side nozzles and foot-space nozzles, which allow only a direct air flow.

Direct air flows are generally felt to be disagreeable because they are associated with pronounced draught effects. Air nozzles with a direct air flow are therefore designed so as to be selectively closeable. They are generally opened only to be used for a short time and, as a rule, remain closed, with the result that there is no longer a guarantee of sufficient ventilation

in the regions assigned to the air nozzles and consequently of the best possible ventilation of the passenger compartment. At a high air throughput, as is desirable for an interior climate of high quality, the closing of the air nozzles with direct air flow leads, in addition, to higher air speeds on the diffuse air-outflow surfaces, and a draught effect can therefore occur.

The present invention seeks to provide an arrangement for feeding conditioned air into passenger compartments of vehicles, which guarantees the best possible draught-free ventilation at a high air throughput, independently of the closing of the air-outflow ports with direct air flow.

According to the invention, there is provided an arrangement for feeding conditioned air into passenger compartments of vehicles with a wide-area diffuse air distribution and selectively closeable air-outflow ports having a direct air flow, wherein at least some of the air-outflow ports are such that, with their closing, they switch to a diffuse air distribution.

Because, according to the invention, the air-outflow ports with direct air flow can be switched to a diffuse air distribution, even when the direct air flow is cut off by closing the corresponding air-outflow ports a ventilation of those regions of the passenger compartment supplied by these is still maintained. Because the closed air-outflow ports are included in the diffuse air distribution, when the direct air flow is cut off the total air-outflow surface available for diffuse air distribution is increased, so that the high air throughput can be maintained, without prejudicing the aim of draught-free ventilation by a higher air-flow speed. The high air throughput is essential for ensuring the best possible interior climate.

Advantageous embodiments of the arrangement according to the invention, with expedient developments and designs of the invention, emerge from the further claims.

The invention is described in detail below with reference to embodiments illustrated in the drawing. In the drawing, each is a diagrammatic representation:
Figure 1 shows a cross-section through a passenger compartment with a view of the dashboard and windscreen,
Figure 2 shows, in cutout form, a longitudinal section through a ventilation nozzle with direct air flow in the dashboard of Figure 1,
Figures 3 and 4 each show, in cutout form, a longitudinal section through a ventilation nozzle with direct air flow in the dashboard of Figure 1, according to a second embodiment, in the open state (Figure 3) and in the closed state (Figure 4),
Figures 5 and 6 each show a longitudinal section through a ventilation nozzle with direct air flow in the dashboard of Figure 1, according to a third and a fourth embodiment.

The passenger compartment 10 (vehicle interior) to be seen diagrammatically in cross-section in Figure 1 and being part of a passenger car is equipped with an arrangement for feeding conditioned air. The conditioned air is supplied by an air-conditioning system (not shown) and conveyed via a duct system 11 to various specific locations of the passenger compartment 10, in order to flow into the passenger compartment 10 there.

Of the passenger compartment 10, Figure 1 shows the dashboard 12, the steering wheel 13, the windscreen 14, the foot space 15, the side spars 16 and the roof 17 which is covered on the inside with the roof lining 18. For air distribution, the air-feed arrangement has, on the one hand, large air-outflow surfaces for diffuse air distribution and, on the other hand, ventilation nozzles with direct air flow. An air-outflow surface 19 for diffuse air distribution is located, for example, on the roof 17 above the air-permeable roof lining 18. For diffuse air distribution, it possesses a plurality of small airholes 20. The air-outflow surface 19 and roof 17 limit an air-distribution box 21 which is connected to

the duct system 11 via at least one air duct 22 extending, for example, in a side spar 16. Ventilation nozzles with direct air flow are located, for example, as middle and side nozzles 23,24 in the dashboard 12 or as foot-space nozzles 25 in the foot space 15 of the passenger compartment 10. Each ventilation nozzle 23-25 has an air-outflow port 26 set into the dashboard 12 or into the interior trim of the foot space 15, and an air-guide housing 27 (Figures 2-6) which is connected to the air-outflow port 26 and to the duct system 11. Each ventilation nozzle is so designed that the air-outflow port 26 can be switched, preferably manually, from direct air flow to diffuse air distribution. This switching can be carried out in various ways.

Embodiments of this are illustrated in Figures 2-6.

In the middle nozzle 23 shown in longitudinal section in Figure 2 and taken as an example of a ventilation nozzle, the air-guide housing 27 is assigned a masking flap 28 which is pivotable through approximately 90° into two end positions. The two pivoting positions are shown in Figure 2 and designated by dot-and-dash lines as I and by unbroken lines as II. In the 0° basic position, the masking flap 28 is parallel to one inner wall of the air-guide housing 27 and opens the air-outflow port 26 completely. In the position pivoted through 90°, II, the masking flap 28 covers the air-outflow port 26 completely. For the pivoting movement, the masking flap 28 is articulated by means of two lateral pins, of which only the pin 29 can be seen in Figure 2, on mutually opposite walls, of which only the wall 30 can be seen in Figure 2, of the air-guide housing 27. The masking flap 28 carries a plurality of through-bores 31 which, when the masking flap 28 is in the position pivoted through 90°, II, ensure diffuse air distribution of the air flowing through the masking flap 28. When the masking flap 28 is in its 0° basic position I, the air-outflow port 26 is opened completely and a direct air flow issues from the air-outflow port 26. The

direction of the issuing air flow is adjustable by means of air-deflecting elements 32 which are located in the air-guide housing 27 at a distance in front of the air-outflow port 26 in the direction of air flow. The air-deflecting elements 32 are arranged pivotally on a web 33 at a distance from and parallel to one another. Furthermore, they are connected pivotally to a common actuating rod 34. By shifting the actuating rod 34 parallel to the web 33, the angle of inclination of the air-deflecting elements 32 in relation to the axis of the air-guide housing 27 can be varied and consequently the direction of flow of the direct air flow issuing from the air-outflow port 26 can be adjusted.

In the middle nozzle 23' illustrated in Figures 3 and 4, the switch from a direct air flow to a diffuse air distribution is obtained by means of lamellae 35 which are arranged pivotally through 90° in the air-guide housing 27. The distance between the lamellae 35 and their length are so co-ordinated that, as a whole, the lamellae 35 pivoted through 90° and aligned transversely relative to the axis of the air-guide housing 27 cover the air-outflow port 26 completely (Figure 4). Each lamella 35 has two through-bores 36. The through-bores 36 as a whole ensure a diffuse air distribution when the air-outflow port 26 is closed off by the lamellae 35. In Figure 3, the lamellae 35 are shown in their 0° basic position. All the lamellae 35 are aligned parallel to the axis of the air-guide housing 27 and thus scarcely impede the air flow. The air-outflow port 26 is completely open and allows a direct air flow. By inclining all the lamellae 35, the direction of air flow of the air issuing from the air-outflow port can be adjusted, so that the lamellae 35 also perform the function of air-deflecting elements.

In the middle nozzle 23" according to Figure 5, for the purpose of switching the air-outflow port 26 from a direct air flow to a diffuse air distribution the air-guide housing 27 is assigned a slide 37 which can be

shifted transversely relative to the longitudinal axis of the air-guide housing 27 into two end positions and at the same time passes through a slot 42 in the wall of the air-guide housing 27. In the slide end position shown in Figure 5, the slide 37 is drawn virtually completely out of the air-guide housing 27. The air-outflow port 26 is opened completely for a direct air flow. By means of air-deflecting elements 32a and 32b, the direction of flow of the issuing direct air can be adjusted. In the second end position represented by dot-and-dash lines in Figure 5, the slide 37 is pushed completely into the air-guide housing 27, specifically immediately in front of the air-outflow port 26, as seen in the direction of air flow, so that the latter is covered by it completely. The slide 37 has a plurality of through-bores 38 which, when the air-outflow port 26 is covered by the slide 37 ensure the diffuse air distribution of the middle nozzle 23".

If there is only very little installation space available behind the dashboard 12 above the ventilation nozzle because of a highly flattened form of the dashboard 12, as occurs, for example, in the region of the side nozzle 24, then, according to the embodiment of a side nozzle 24 shown in longitudinal section in Figure 6, there is used, instead of a slide, a blind 39 which is shiftable within the air-guide housing 27 transversely to its longitudinal axis and which runs through a slot 42 in the air-guide housing 27, via a deviating element 40, onto the outside of the air-guide housing 27 parallel to the latter. The blind 39 is, once again, shiftable into two end positions. In the end position shown in Figure 6, the air-outflow port 26 is opened completely for a direct air flow. In the second end position of the blind 39, represented by dot-and-dash lines in Figure 6, the latter covers the air-outflow port 26 completely. In this end position of the blind 39, a plurality of through-bores 41 located in the blind 39 ensures a diffuse air distribution. In order to influence the air-outflow direction in a direct air flow, once again the air-deflecting elements

32a and 32b, as described in Figures 5 and 6, are provided.

Claims

1. An arrangement for feeding conditioned air into passenger compartments of vehicles with a wide-area diffuse air distribution and selectively closeable air-outflow ports having a direct air flow, wherein at least some of the air-outflow ports are such that, with their closing, they switch to a diffuse air distribution.

2. An arrangement according to Claim 1, wherein the switchable air-outflow ports are assigned to the middle, side and foot-space nozzles of the passenger compartment.

3. An arrangement according to Claim 1 or 2, wherein an air-guide housing is connected to each switchable air outflow port, and pivotable air-deflecting elements for adjusting the direction of the direct air flow are arranged in the air-guide housing immediately in front of the air-outflow port, as seen in the direction of air flow.

4. An arrangement according to Claim 3, wherein the air-deflecting elements comprise lamellae pivotable through 90°, which, in their basic position, open a maximum air-passage cross-section and, in their position pivoted through 90°, cover the air-outflow port completely, and the lamellae are provided with air-passage through-bores extending transversely to the pivot axis and intended for the diffuse air distribution.

5. An arrangement according to Claim 3, wherein the air-guide housing is assigned a masking flap pivotable through approximately 90°, which completely opens the air-outflow port in its basic position (I) and which covers the latter completely in its position pivoted through 90° (II), and wherein the masking flap has a plurality of air-passage through-bores for diffuse air distribution.

6. An arrangement according to Claim 5, wherein the masking flap is arranged inside the air-guide housing and is articulated pivotally on mutually opposite walls of the air-guide housing by means of two lateral pins.

7. An arrangement according to any one of Claims 1-3, wherein the air-guide housing is assigned a slide which is provided with a plurality of air-passage through-bores for diffuse air distribution and which completely opens the air-outflow port in one end position and completely covers it in its other end position.

8. An arrangement according to any one of Claims 1-3, wherein the air-guide housing is assigned a blind which is provided with a plurality of air-passage through-bores for diffuse air distribution and which completely opens the air-outflow port in one end position and completely covers it in its other end position.

9. An arrangement according to Claim 7 or 8, wherein the slide or the blind is guided in a slot in the air-guide housing transversely relative to its housing axis.

10. An arrangement for feeding conditioned air into passenger compartments of vehicles with a wide-area diffuse air distribution and selectively closeable air-outflow ports having a direct air flow, substantially as described herein with reference to, and as illustrated in, the accompanying drawings.

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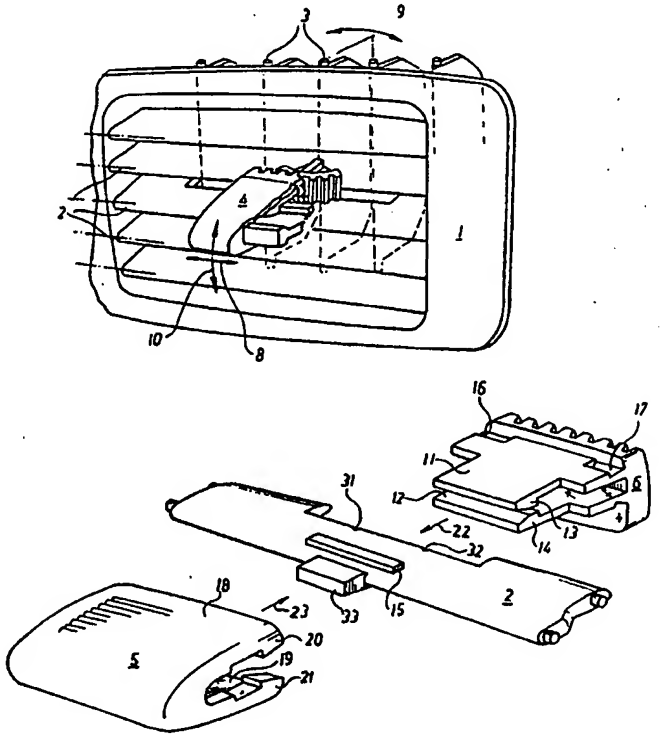
(54) Title: PANEL-MOUNTED NOZZLE WITH IMPROVED ACTUATING MEANS

(57) Abstract

A panel-mounted nozzle for ventilation or climate control installations, primarily intended for motor vehicle compartments, comprising guide vanes (2, 3) disposed in two layers, wherein the guide vanes within one and the same layer are pivotally mounted and arranged in parallel relationship and wherein the guide vanes of one of the layers extend perpendicular to the direction of extension of the guide vanes of the other layer. In addition, the nozzle has an actuating means (4) which is non-rotationally mounted on a guide vane (2) and comprises a protruding grip member (5) serving as a lever for pivoting this guide vane (2) and the rest of the guide vanes in the same layer, said actuating means also being displaceable in the longitudinal direction of said guide vane (2) and further comprising a first toothed segment (6), said segment being located at the end remote from said grip member (5) and in engagement with a matching second toothed segment (7), which second toothed segment (7) is arranged on a guide vane (3) in the other layer in order to cause pivotal movement of the guide vanes of said other layer in response to its displacement. Particular features of the invention are that the actuating means (4) is secured to the guide vane (2) by means of a snap fastening arrangement and in that it further comprises spring means (27, 28), said spring means being integrated therewith and biasing the guide vane (2) to increase the friction.



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PANEL-MOUNTED NOZZLE WITH IMPROVED ACTUATING MEANS

The present invention relates to a panel-mounted nozzle for ventilation or climate control installations, primarily intended for motor vehicle compartments, comprising guide vanes disposed in two layers, wherein the guide vanes within one and the same layer are pivotally mounted and arranged in parallel relationship and wherein the guide vanes of one of the layers extend at right angles to the direction of extension of the guide vanes of the other layer, and an actuating means, said actuating means being non-rotationally mounted on a guide vane and comprising a protruding grip member serving as a lever for pivoting the associated guide vane and the rest of the guide vanes in the same layer, said actuating means also being displaceable in the longitudinal direction of said guide vane and further comprising a first toothed segment, said segment being located at the end remote from said grip member and in engagement with a matching second toothed segment, which second toothed segment is arranged on a guide vane in the other layer in order to cause pivotal movement of the guide vanes of said other layer in response to its displacement.

Panel-mounted nozzles of the type described above are previously known. However, the actuating means must be designed to ensure that the friction between the actuating means and the associated guide vane is such as to allow convenient displacement of the actuating means while at the same time ensuring that the latter remains in the position wherein it is set without being affected by the air flow through the nozzle, by vehicle vibrations or the like. Generally, this is achieved by means of a small metal spring which is inserted between the actuating means and the associated guide vane. However, several disadvantages are associated with such springs, among

them that they are small and consequently difficult to mount, which renders the mounting process time-consuming and therefore expensive, and also the fact that they are made from a different material from the rest of the panel-mounted nozzle, which is unfavourable from an environmental point of view.

The object of the present invention therefore is to provide a panel-mounted nozzle which completely or partly eliminates the above problems inherent in prior-art technology.

This object is achieved by means of a panel-mounted nozzle of the kind defined in the appended claims.

The invention will be described for exemplifying purposes in the following by way of one embodiment thereof and with reference to the accompanying drawings, wherein:

Fig. 1 is a view of a panel-mounted nozzle in accordance with the invention, with parts of the actuating means being broken away;

Fig. 2 is a view from above of the actuating means and the guide vanes directly affected by said means;

Fig. 3 is an exploded view of the actuating means and the associated guide vane on which it is mounted;

Fig. 4 is a cross-sectional view through the actuating means and its associated mounting guide vane, the section being taken at right angles to the longitudinal direction of the guide vane;

Fig. 5 is a cross-sectional view through the actuating means and its associated mounting guide vane, the sectional plane coinciding with the plane of the guide vane;

Fig. 6 is a view of the toothed segment of the actuating means, and

Fig. 7 is a cross-sectional view through the actuating means of the invention in accordance with another embodiment thereof.

As appears from Fig. 1, a panel-mounted nozzle in accordance with the invention comprises an outer frame 1 in which guide vanes 2, 3 are pivotally mounted. The guide vanes are arranged in two layers, the guide vanes of one and the same layer being arranged in parallel with one another. The guide vanes 2 of the outermost layer extend essentially perpendicular to the direction of extension of the guide vanes 3 of the layer behind. In addition, the nozzle comprises an actuating means 4.

The actuating means 4 is positioned on a guide vane 2 of the outer layer and as appears from Fig. 2 it comprises a grip member 5 projecting outwardly from the associated guide vane 2, and a toothed segment 6 positioned on the opposite side of the guide vane from the grip member. The actuating means is arranged to be displaceable in the longitudinal direction of the guide vane 2, as indicated by double arrow 8. In addition, the toothed segment 6 engages a second toothed segment 7, the latter being mounted on a guide vane 3 belonging to the set of guide vanes of the rear layer. Owing to this arrangement, displacement movements 8 of the actuating means 4 will be translated into a pivotal movement of the rear guide vane 3, as illustrated by double arrow 9. For this reason, the second toothed segment preferably has an arcuate configuration to ensure continuous engagement during the entire pivotal movement. Both the guide vanes of the outer layer 2 and the guide vanes of the layer 3 behind preferably are interconnected in a way ensuring that a pivotal movement of one guide vane will be transferred in such a manner that the rest of the vanes of the same layer will be correspondingly pivoted, and such that the guide vanes of one and the same layer remain in interparallel relationship, also following the completion of a pivotal movement.

The actuating means is movable only in the longitudinal direction of the guide vane 2 and thus it is non-rotationally secured in a plane at right angles to that

direction. The projecting grip member 5 thus serves as a lever for pivoting the guide vanes 2 of the outer layer as it is being pivoted about the pivot axis of the guide vane, as illustrated by double arrow 10 in Fig. 1.

The actuating means in accordance with the shown embodiment comprises two separate parts, as appears from Fig. 3, one part consisting of the grip member 5 and the second part of the toothed segment 6.

The part comprising the toothed segment 6 is manufactured from a material that is at least somewhat resiliently flexible and that preferably has satisfactory bearing properties, such as e.g. POM. In addition to the toothed segment 6, the part also comprises flanges 11, 12 projecting away from the segment 6. The flanges 11, 12 extend essentially in parallel and perpendicularly to the plane of the toothed segment 6. The flange ends remote from the toothed segment 6 are formed with facing hook means 13, 14. These hook means are configured for cooperation with an abutment edge 15 formed on the guide vane 2, whereby when the projecting flanges 11, 12 of the toothed segment part are passed across the guide vane 2, as illustrated by arrow 22, the hook means 13, 14 act as snap fastening means, securing the toothed segment part to the guide vane 2, as illustrated in Fig. 4. Advantageously, one abutment edge 15 of this nature is provided on both sides of the guide vane. Furthermore, the flanges 11, 12 are provided with abutment edges 16, 17.

The part of the actuating means that comprises the grip member 5 is likewise formed with two flanges 18, 19, also provided with facing hook means 20, 21. These hook means 20, 21 are adapted to engage the abutment edges 16, 17 on the toothed segment in snap-fastener fashion, when the grip member, from the opposite direction relative to the first hook means, as illustrated by arrow 23, is passed across the guide vane 2 and the toothed segment already mounted thereon. In addition, the hook means 20, 21 preferably are configured like recesses having lateral

which are turned in opposite directions, an arrangement which ensures that the grip member is restrained against movement in both the forwards and the rearwards directions.

Owing to this mounting arrangement the grip member part will have no direct contact with the guide vane but only with the toothed segment part. Consequently, the grip member part may be manufactured from a different artificial material, such as e.g. ABS, PP or TPE, materials which do no possess the same bearing properties as those required from the material of the toothed segment part.

Further the toothed segment 6 in accordance with the shown embodiment is formed with recesses 24, 25 which are disposed essentially centrally in the segment and side by side relative to the longitudinal direction of the toothed segment. Thus, a middle portion 26 forms intermediate these recesses.. From the middle portion, resilient arms 27, 28 serving as a leaf springs, project into the recesses 24, 25. The arms extend essentially in parallel with the longitudinal direction of the toothed segment and protrude somewhat from the rear face of the toothed segment. In the mounted position of the toothed segment part on the guide vane, these arms will abut against the guide vane and due to their resilience exert some depressing force on said vane. This furthers the holding-together effect between the toothed segment part and the guide vane while at the same time increasing the friction between these parts, ensuring that the guide vanes remain in a set position.

In addition, the resilient arms may be formed with edges 29, 30 which edges are turned towards the guide vane and are adapted to cooperate with grooves 31, 32 formed in the guide vane and turned towards the toothed segment. Thanks to the provision of these edges 29, 30 and grooves 31, 32 increased friction is obtained in one or several particular positions of the guide vanes, such

as a central position thereof. This allows the user to find this position more readily when he wishes to adjust the guide vanes while at same time the guide vanes remain particularly well in this position.

Fig. 7 illustrates an alternative embodiment of the actuating means in accordance with the invention. In accordance with this embodiment the toothed segment is formed with one recess only which is configured for receiving therein a resilient arm 31 secured at two opposite ends and arranged to pivot between two positions as indicated in dash-and-dot lines in the drawing figure. Other ways of integrally fastening arms serving as leaf springs are, for course, feasible.

The mounting of the actuating means on the guide vane in this manner, with no holding force being exerted (on that means) in the longitudinal direction of the guide vane while at the same time only the toothed segment part is in direct abutment contact with the guide vane, makes the actuating means easy to displace.

In addition, the guide vane may be configured with a protruding stop shoulder 33 which is arranged to be received in a cavity in the grip member part 5 as the actuating means 4 assumes its mounted position. The stop shoulder thus will abut against the grip member side edges in the end positions of the displacement stroke, limiting the stroke length.

The invention has been described above with reference to one embodiment thereof. Other embodiments of the invention are, however, possible. For example, the second actuating means part could be manufactured from other artificial materials than those indicated, the snap fastening means may be designed in a different manner and possibly also other fastening varieties are feasible. Such modifications must be regarded as equivalent and therefore to be within the scope of protection of the invention as the latter is defined in the appended claims.

CLAIMS

1. A panel-mounted nozzle for ventilation or climate control installations, primarily intended for motor vehicle compartments, comprising guide vanes (2, 3) disposed in two layers, wherein the guide vanes within one and the same layer are pivotally mounted and arranged in parallel relationship and wherein the guide vanes of one of the layers extend perpendicular to the direction of extension of the guide vanes of the other layer, and an actuating means (4), said actuating means being non-rotationally mounted on a guide vane (2) and comprising a protruding grip member (5) serving as a lever for pivoting the associated guide vane (2) and the rest of the guide vanes in the same layer, said actuating means also being displaceable in the longitudinal direction of said guide vane (2) and further comprising a first toothed segment (6), said segment being located at the end remote from said grip member (5) and in engagement with a matching second toothed segment (7), which second toothed segment (7) is arranged on a guide vane (3) in the other layer in order to cause pivotal movement of the guide vanes of said other layer in response to its displacement, c h a r a c t e r i s e d in that the actuating means (4) is secured to the guide vane (2) by means of a snap fastening arrangement and in that it further comprises spring means (27, 28), said spring means being integrated therewith and biasing the guide vane (2) to increase the friction.

2. A panel-mounted nozzle as claimed in claim 1, c h a r a c t e r i s e d in that the actuating means comprises two parts, one toothed segment part comprising the toothed segment (6) and one grip member part comprising the grip member (5).

3. A panel-mounted nozzle as claimed in claim 2, c h a r a c t e r i s e d in that spring means (27, 28) are integrally coupled to the toothed segment part and are made from the same material as said part.

4. A panel-mounted nozzle as claimed in claim 2 or 3, c h a r a c t e r i s e d in that the toothed segment part is mounted directly on the guide vane by snap fastening means whereas the grip member part is arranged on the first-mentioned part by snap fastening means, said latter part having no direct contact with the guide vane.

5. A panel-mounted nozzle as claimed in any one of the preceding claims, c h a r a c t e r i s e d in that the spring means comprise at least one arm (27, 28, 31) extending essentially in the direction of the guide vane and acting as a leaf spring.

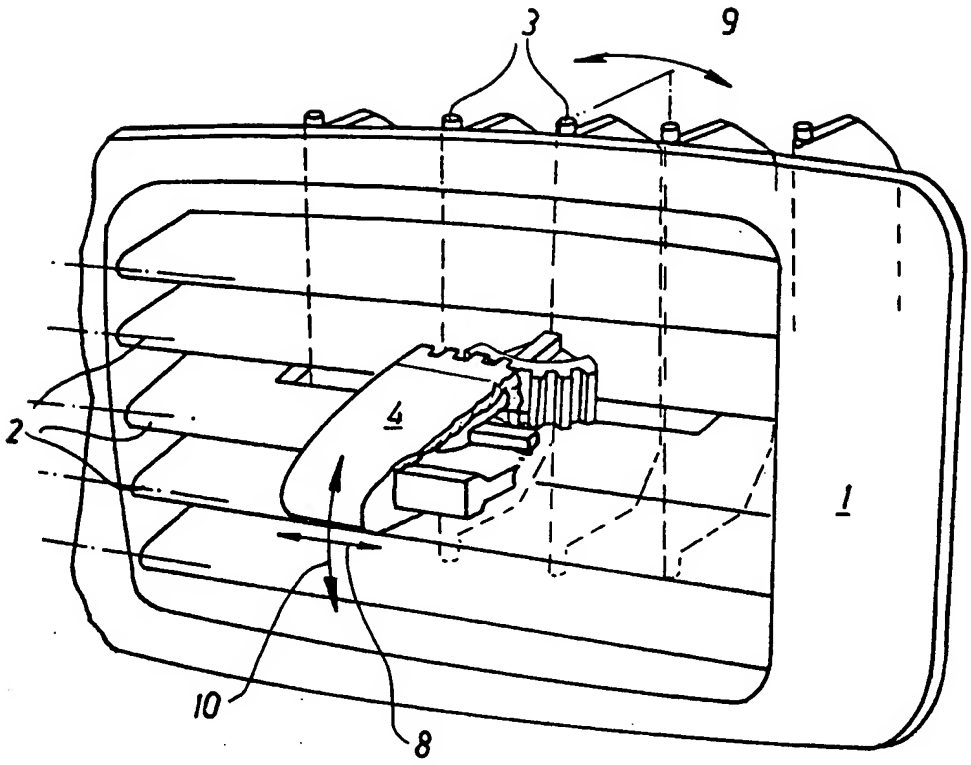

Fig. 1

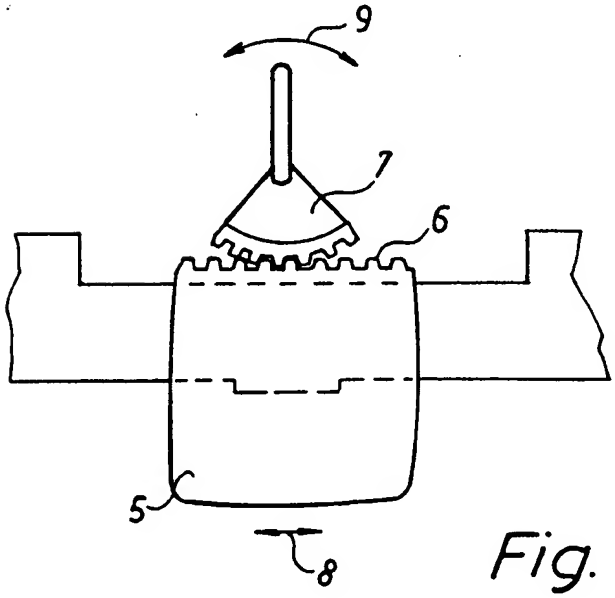

Fig. 2

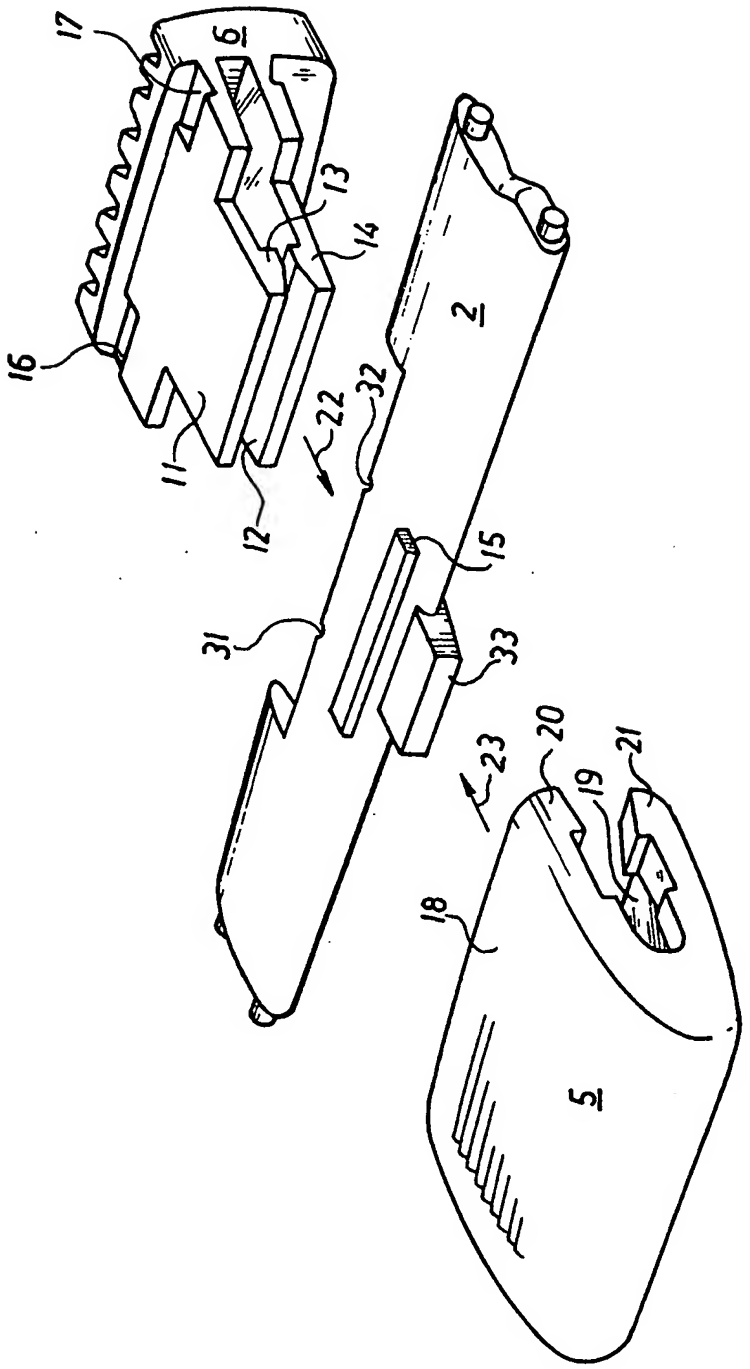

Fig. 3

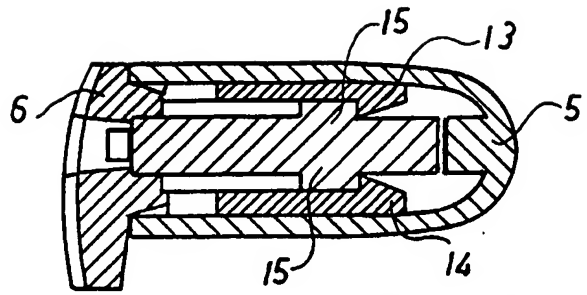

Fig. 4

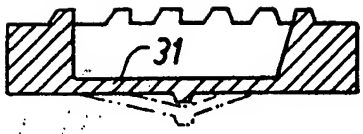

Fig. 7

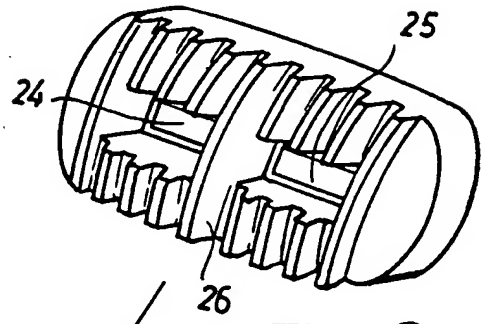

Fig. 6

Fig. 5